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10/539,572	06/17/2005	Bertrand Viellerobe	0501-1136	4337

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EXAMINER	
WERNER, DAVID N	

ART UNIT	PAPER NUMBER
2621	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/539,572	VIELLEROBE ET AL.	
	Examiner	Art Unit	
	David N. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action for U.S. patent Application 10/539,572 is responsive to communications filed 4 November 2009, in reply to the Non-Final Rejection of 4 August 2009. Currently, Claims 1–24 are pending.

2. In the previous Office action, the specification was objected to for containing an embedded hyperlink. Claims 1–15 and 17–24 were rejected under 35 U.S.C. 103(a) as obvious over "New SNOM sensor using optical feedback in a VCSEL-based compound-cavity" (*Gorecki*) in view of "Parallel confocal laser microscope system using smart pixel arrays (*Narusé*). Claim 16 was rejected under 35 U.S.C. 103(a) as obvious over *Gorecki* in view of *Narusé* and in view of "Simple reflection Scanning Near-field Optical Microscope using the black reflected light inside the laser cavity as detection mode" (*Schwarz*).

Priority

3. The Office has received a copy of the French priority action from the International Bureau. No further action is required by the Applicant to submit an additional copy.

Response to Amendment

4. Applicant's amendment to the specification has been fully considered. The objection to the specification is withdrawn.

Response to Arguments

5. Applicant's arguments filed with respect to Claim 1 have been fully considered but they are not persuasive. Applicant in pages 11–12 of the *Remarks* filed 4 November 2009 alleges four differences between the present invention and the *Gorecki* reference:

I. The present invention is directed to a confocal microscope whereas the *Gorecki* reference does not disclose confocal microscopy with spatial filtering, but instead a scanning near-field optical microscope (SNOM).

II. The present invention discloses optical elements such as lenses for focusing an illuminating beam, but *Gorecki* does not disclose this limitation.

III. The present invention discloses fast scanning a tip of a microscope, whereas *Gorecki* discloses slow scanning of a sample.

IV. The present invention discloses an array of VCSEL devices, whereas *Gorecki* only discloses a single VCSEL.

With respect to the first alleged difference, the only mention of a "confocal" microscope within Claim 1 is in the preamble, which recites "[a] parallel confocal laser microscopy system". A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re*

Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

With respect to the second alleged difference, the previous Office action mapped the microtip of *Gorecki* to the "optical means" that focuses the light beams. *Office action*, pg. 3. The Office action discussed with respect to claim 17 that the microtip "performs the claimed step of focusing the light". *Id.*, pg. 5. *Gorecki* itself states that the microtip transforms evanescent light to propagating light for detection within the VCSEL cavity, and changes the parallel light beam emitted from the light source to a backscattered beam that may be detected. *Gorecki*, pg. 116: column 1. The microtip itself is designed so that the light beam is emitted from the very "aperture" of the microtip, as illustrated in figure 4. The microtip has two functions: to focus the emitted laser light onto the sample, and to scatter the reflected light for collection. Applicant has not shown why the microtip in *Gorecki* is not or cannot be the claimed focusing optical means.

With respect to the third alleged difference, Claim 1 does not contain any limitation describing the scanning process. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 19998); *In re van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With respect to the fourth alleged difference, the examiner conceded that *Gorecki* only uses a single VCSEL instead of an array of VCSELs in the previous Office action. *Office action*, pg. 4. However, the *Narusé* reference was used to illustrate the use of

the array of VCSEL components in parallel processing. *Id.* Applicant concedes on page 13 of the *Remarks* that "Naruse et al. discloses arrays of VCSEL and detectors", and that such an array was "conventional" and admitted as prior art in the specification and figure 1 of the present application. Applicant is reminded that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

6. Applicant's arguments filed with respect to Claim 17 have been fully considered but they are not persuasive. Applicant states that neither the *Gorecki* nor *Narusé* references disclose the claimed limitations of focusing light beams on an object to be observed, receiving light beams originating from an object through a VCSEL laser cavity to a photodetector arranged on a face of the VCSEL laser, and using an opening of the cavity as the filtering hole for the light beam. *Remarks*, pp. 12–14.

As mentioned above with respect to Claim 1, the microtip of *Gorecki* is believed to perform the claimed focusing step. Applicant is reminded that once a *prima facie* case of obviousness is established, the burden shifts to the applicant to come forward with arguments and/or evidence to rebut the *prima facie* case. MPEP §2145.

As shown in figure 4a of the specification of the present application, reproduced on page 10 the *Remarks*, a return signal enters a VCSEL through a cavity opening on its surface. The cavity opening serves as a pinhole filter. A photodetector is placed behind the VCSEL. The photodetector detects the return signal passed through the

VCSEL. Compare this with figure 4 of *Gorecki*. Figure 4 of *Gorecki* shows a laser beam reflected off a sample on the microtip placed inside a cavity opening in a VCSEL. The cavity opening that contains the microtip in *Gorecki* appears to be identical to the cavity opening in figure 4a of the present application. In *Gorecki*, behind this VCSEL which receives reflected light is a detector, again, as in the present application.

Applicant's argument regarding Claim 16 is moot since Applicant only argues the patentability of Claim 16 as dependent on Claim 1 and not on its own merits.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1–15 and 17–24 are rejected under 35 U.S.C. 103(a) as being unpatentable over "New SNOM sensor using optical feedback in a VCSEL-based compound-cavity" (*Gorecki*) in view of "Parallel confocal laser microscope system using smart pixel arrays" (*Narusé*), cited in the 28 September 2005 IDS and described in page 1 of the specification. Gorecki et al. teaches a microscope head or sensor comprising a VCSEL laser. Regarding Claim 1, Figure 4 illustrates a cross-section of the sensor. The laser is directed at the sample on the bottom of the diagram, and is emitted through the microtip (pg. 115: column 2). Then, the VCSEL is a claimed VCSEL for emitting a

light beam, and the microtip is the claimed optical means that focuses the light. Additionally, on the rear of the VCSEL, or the top of the diagram, the PIN detector detects backscattered light reflected off the sample and back into the VCSEL cavity (pg. 116: column 1). Then, the Gorecki et al. sensor has a photodetector arranged on a face of the VCSEL laser that receives a light beam originating from a subject via the laser cavity. Compare Figure 4a of the specification of the present application with figure 4 in *Gorecki*. The ring electrode shown in figure 4 of *Gorecki* is the claimed opening in the cavity used as a filtering hole. However, the present invention differs from *Gorecki* in that in the present invention, an "array" of VCSEL devices is presented in the microscope, whereas *Gorecki* uses a single VCSEL.

Naruse et al. discloses a parallel confocal microscope, described in page 1: lines 14–31 of the specification as representative of the art. Regarding claim 1, figure 1 of Naruse et al. illustrates the microscope, comprising an array of VCSEL elements, each providing a light source onto the specimen that is backscattered and detected at the photodetector array. Since in this case multiple "smart pixels" are processed in parallel, as opposed to the single pixel processed by the single photodetector in Gorecki et al., real-time scanning can be performed (pp. 95–96).

Gorecki et al. discloses the claimed invention except for an "array" of lasers producing a plurality of "light beams". Naruse et al. teaches that it was known to use an array of VCSEL components to facilitate parallel processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to modify the microscope head of Gorecki et al. to use an array of elements, as taught by

Naruse et al., since Naruse et al. states in pages 95–96 that such a modification would allow for real-time imaging.

Regarding Claim 2, as shown in figure 4 of Gorecki et al., the cavity opening of the VCSEL is positioned on the bottom of the laser, and the PIN detector is positioned on top of the laser, or opposite the cavity opening.

Regarding Claim 3, in Gorecki et al., the VCSEL-based sensor is designed to be mounted on a "scanning piezoelectric cantilever" (pg. 122: column 2) or "positioner" that moves the sample (pg. 116: column 2; pg. 118: column 1).

Regarding Claim 4, the multiple VCSEL sensors in Naruse et al. are specifically designed to facilitate real-time imaging (pg. 96).

Regarding Claims 5 and 6, both Gorecki (pg. 116: column 2) and Naruse (figure 6) specify that the specimen is mounted on a piezoelectric stage, commonly considered to be a Micro-Electro-Mechanical Systems (MEMS) component.

Regarding Claims 7 and 8, in Naruse et al., the scanning process may be embodied as a process of moving the "optical system" so that the entire specimen is covered (pg. 95).

Regarding Claims 9 and 10, in Gorecki et al., the microtip is described in page 116: column 1 as back-scattering reflected light from the subject through the VCSEL cavity to the PIN detector, and causing a "power modulation" of light energy with the sample surface.

Regarding Claim 11, in Naruse et al., the array of plural photodetectors is the claimed "synchronous detection means".

Regarding Claims 12 and 13, when the microscope is embodied so that the apparatus moves over a stationary specimen during scanning, then the microtip of Gorecki et al. is the claimed lens that allows for image acquisition at different depths.

Regarding Claim 14, Gorecki et al. describes an experimental setup in which the "z-scan" or distance between the VCSEL and subject is variable (pg. 118: column 1).

Regarding Claim 15, in Gorecki et al., the IC microhead comprising the PIN detector, laser, and microtip is the claimed "miniature head in the form of a housing".

Regarding Independent Claim 17, in Gorecki et al., a VCSEL laser performs the step of emitting a light beam. A microtip performs the claimed step of focusing the light beam on an object to be observed. A PIN detector performs the claimed step of receiving a light beam via the VCSEL cavity. A ring electrode performs the claimed step of filtering. By producing multiple instances of this sensor in an array, as in Naruse et al., the "plurality" of light beams is emitted.

Regarding Claim 18, Naruse is described as scanning the specimen by either moving the specimen beneath a stationary device or moving the device over a stationary specimen (pg. 95).

Regarding Claim 19, the multiple VCSEL sensors in Naruse et al. are specifically designed to facilitate real-time imaging (pg. 96).

Regarding Claims 20 and 21, in Naruse et al., in Naruse et al., the scanning process may be embodied as a process of moving the "optical system" so that the entire specimen is covered (pg. 95).

Regarding Claims 22 and 23, both Gorecki (pg. 116: column 2) and Naruse (figure 6) specify that the specimen is mounted on a piezoelectric stage, commonly considered to be a Micro-Electro-Mechanical Systems (MEMS) component.

Regarding Claim 24, in Gorecki et al., the microtip is described in page 116: column 1 as causing a "power modulation" of light energy with the sample surface. Additionally, the array of VCSELs in *Narusé*, modified to contain the backing photodetectors of Gorecki et al., carry out "synchronous detection" at the photodetector level.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gorecki et al. and Naruse et al. as applied to claim 15 above, and further in view of "Simple reflection Scanning Near-field Optical Microscope using the back reflected light inside the laser cavity as detection mode" (*Schwartz*). Claim 16 is directed to placing a miniature head at the end of an endoscope. Gorecki et al. and Naruse et al. do not disclose this embodiment.

Schwarz et al. teaches a laser microscope similar to that in Gorecki et al. Regarding Claim 16, in Schwarz et al., as shown in figures 2, 3, and 5, the laser is connected to one end of an optical fiber, with the other end of the fiber, or tip, held near

the sample (pg. 303: column 2). Then, Schwarz et al. can said to place a head at the end of an endoscope.

Gorecki et al. in combination with Naruse et al. discloses the claimed invention except for using an endoscope. Schwarz et al. teaches that it was known to place the tip of a laser microscope at the end of a fiber. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to modify the microscope of Gorecki et al. to use the fiber of Schwarz et al., since Schwarz et al. states in page 303: column 2 that such a modification would enable fine control of the head near the sample.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

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